III.B.3.N.a. Extremely xeromorphic deciduous subdesert shrubland without succulents

III.B.3.N.a.4. PROSOPIS GLANDULOSA SHRUBLAND ALLIANCE

Honey Mesquite Shrubland Alliance

[NO ASSOCIATION]

ALLIANCE CONCEPT

GLOBAL SUMMARY: This alliance includes shrublands dominated by *Prosopis glandulosa*. Shrublands in this alliance can cover extensive areas, invading open grasslands and often forming thickets. The shrublands extend up to 4500 feet elevation. Associated species can include *Atriplex canescens, Bouteloua curtipendula, Bouteloua gracilis, Muhlenbergia porteri, Sporobolus airoides, Sporobolus flexuosus*, and *Buchloe dactyloides*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Not Applicable

Zion National Park Environment: This alliance was not sampled at Zion NP, but occurred in the environs and was mapped. Sampling is needed to determine association level environmental information.

Global Environment: Shrublands included in this alliance occur from southwestern Oklahoma to the coast of southern Texas, and west to southern Nevada. Elevation ranges from 1-1600 m. Climate is arid to semi-arid, with hot summers and freezing temperatures not uncommon during the winter. Precipitation varies with geography. At the Jornada Experimental Range in southwestern New Mexico, annual precipitation ranged from 7-45 cm with mean annual precipitation of about 23 cm (Herbel et al. 1972). The precipitation has a bimodal distribution with about two-thirds of the precipitation falling during July to October and a third falling during the winter months. Farther west the proportion of summer precipitation decreases and winter precipitation dominates (Barbour and Major 1977). Sites include sandy plains, gypsum hills, coppice dunes, terraces along intermittent drainages, and moderately saline soils just above tidal flats. They are generally flat or gently sloping, and this vegetation occurs on all aspects. Substrate is usually sandy or gravelly alluvium, but may be composed of eolian sands and deltaic clays. Parent materials include andesite and rhyolite. Soils are generally coarse-textured, but may include gravelly clay loams. Some sites are moderately saline. These shrublands may grade into grasslands dominated by *Bouteloua gracilis, Sporobolus airoides, Pleuraphis mutica (= Hilaria mutica)* or may be surrounded by a matrix of desertscrub dominated by *Larrea tridentata* or *Ambrosia* spp.

VEGETATION DESCRIPTION

Zion National Park Vegetation: This alliance was not sampled at Zion NP, but occurred in the environs and was mapped. Sampling is needed to determine association level vegetation information.

Global Vegetation: Shrublands included in this alliance cover extensive areas of sandy plains and valleys, gypsum hills and dunes from southwestern Oklahoma to the coast of south Texas and across southern New Mexico and southeastern Arizona, invading open grasslands and often forming thickets. In western Arizona and other dry portions of its range, the vegetation occurs as arroyo riparian and dune vegetation types. Stands have moderate to dense cover dominated by the xeromorphic deciduous shrub *Prosopis glandulosa*. The diversity of other species can vary greatly with geography and substrate, with dune communities the most depauperate and riparian arroyos the most diverse. Other characteristic shrubs include *Acacia greggii, Artemisia filifolia, Atriplex canescens, Chilopsis linearis, Ericameria laricifolia, Gutierrezia sarothrae, Krascheninnikovia lanata, Larrea tridentata, Lycium berlandieri*, and *Ziziphus obtusifolia*. Succulents may include *Opuntia acanthocarpa, Opuntia leptocaulis, Opuntia imbricata, Opuntia phaeacantha, Yucca baccata, Yucca elata*, and *Yucca glauca*. Depending on geography, substrate and land-use history, the graminoid layer can be moderately dense to insignificant. Characteristic perennial grasses include *Aristida* spp., *Bouteloua curtipendula, Bouteloua eriopoda, Bouteloua gracilis, Buchloe dactyloides, Pleuraphis jamesii (= Hilaria jamesii), Pleuraphis mutica (= Hilaria mutica), Muhlenbergia porteri, Sporobolus flexuosus*, and *Sporobolus wrightii*. Sparse annual grasses such as *Aristida adscensionis, Bouteloua barbata*, and *Dasyochloa pulchella (= Erioneuron pulchellum)* may be present. Forb cover is also sparse, but it can be relatively

diverse. Common forbs include species of *Chenopodium, Croton, Eriogonum, Euphorbia, Solanum*, and *Zinnia*. In more saline areas, shrubs are sparser and grasses and forbs are more common and may include *Spartina spartinae, Borrichia frutescens, Sporobolus airoides, Distichlis spicata*, and *Sesuvium verrucosum*. Bourgeron et al. (1993b) described several stands at the Gray Ranch with canopy cover for *Prosopis glandulosa* and perennial grasses (dominated by *Bouteloua* spp.) ranging from 10-30% and 3-55%, respectively..

Global Dynamics: Shrublands dominated by *Prosopis glandulosa* have replaced large areas of desert grasslands, especially those formerly dominated by *Bouteloua eriopoda*, in Trans-Pecos Texas, southern New Mexico and southeastern Arizona (Hennessy et al. 1983, York and Dick-Peddie 1969). Studies on the Jornada Experimental Range suggest that combinations of drought, overgrazing by livestock, wind and water erosion, seed dispersal by livestock, fire suppression, shifting dunes, and changes in the seasonal distribution of precipitation have caused this recent, dramatic shift in vegetation physiognomy (Buffington and Herbel 1965, Gibbens et al. 1983, Herbel et al. 1972, Hennessy et al. 1983, Humphrey 1974, McLaughlin and Bowers 1982, McPherson 1995, Schlesinger et al. 1990).

Prosopis spp. have extensive root systems that allow them to exploit deep soil water that is unavailable to shallower rooted grasses and cacti (Burgess 1995). This strategy works well, except on sites that have well-developed argillic or calcic soil horizons that limit infiltration and storage of winter moisture in the deeper soil layers (McAuliffe 1995). McAuliffe (1995) found *Prosopis* spp. invasion on these sites to be limited to a few, small individuals. This has implications in plant geography and grassland revegetation work in the southwestern United States..

MOST ABUNDANT SPECIES

Zion National Park

Stratum	Species
TALL SHRUB	*Prosopis glandulosa*

Global

Stratum	Species
TALL SHRUB	*Prosopis glandulosa*
SHORT SHRUB	*Acacia greggii, Artemisia filifolia, Atriplex canescens, Chilopsis linearis, Ericameria laricifolia, Gutierrezia sarothrae, Krascheninnikovia lanata, Larrea tridentata, Lycium berlandieri*, and *Ziziphus obtusifolia*
GRAMINOID	*Spartina spartinae, Sporobolus airoides, Distichlis spicata*,

CHARACTERISTIC SPECIES

Zion National Park

Stratum	Species
TALL SHRUB	*Prosopis glandulosa*

Global

Stratum	Species
TREE CANOPY	*Prosopis glandulosa*

OTHER NOTEWORTHY SPECIES

Global

Stratum	Species
GRAMINOID	*Bromus rigidus, Bromus tectorum*

GLOBAL SIMILAR ALLIANCES:

- PROSOPIS GLANDULOSA WOODLAND ALLIANCE (A.611)
- PROSOPIS GLANDULOSA TEMPORARILY FLOODED WOODLAND ALLIANCE (A.637)
- PROSOPIS (GLANDULOSA, VELUTINA) WOODLAND ALLIANCE (A.661)
- PROSOPIS GLANDULOSA SHRUB HERBACEOUS ALLIANCE (A.1550)

GLOBAL STATUS AND CLASSIFICATION COMMENTS

Global Conservation Status Rank: Not Applied to alliances.

Global Comments: Although stand structure is different, all the similar alliances include stands that are dominated or codominated by *Prosopis glandulosa*. Some arroyo riparian stands in Arizona are similar to stands in the *Baccharis sarothroides, Acacia greggii*, and *Parkinsonia* spp.-dominated alliances.

Classification of *Prosopis glandulosa*-dominated stands needs clarification. Because *Prosopis glandulosa* can have both shrub and tree growth forms, there may be confusion classifying a given stand. For example, what characteristic separates a *Prosopis* arroyo riparian woodland from a shrubland? Currently, mesquite coppice dunes, which may be better classified in a sparsely vegetated alliance, are included in this alliance. Also, the formation in which this alliance is classified does not allow succulents. However, many stands in this alliance have a fairly consistent presence of succulents, usually species of *Opuntia* and *Yucca*.

ELEMENT DISTRIBUTION

Zion National Park Range: This alliance was not sampled at Zion NP, but occurred in the environs and was mapped. It likely occurs in lowlands and disturbed riparian forest in canyon.

Global Range: Shrublands included in this alliance are found in southwestern Oklahoma, western and southern Texas, west across the Chihuahuan and Sonoran deserts and into southern Nevada. The alliance likely occurs in adjacent northern Mexico.

Nations: MX US
States/Provinces: AZ MXNU MXTM NM NV OK UT TX

ELEMENT SOURCES

Zion National Park Inventory Notes: Plots: None
Classification Confidence: 2 **Identifier:** A.1031
REFERENCES: Barbour and Major 1977, Beatley 1976, Bourgeron et al. 1993b, Bourgeron et al. 1995, Bowers 1984, Brown 1982, Brown et al. 1977a, Buffington and Herbel 1965, Burgess 1995, Diamond 1993, Dick-Peddie 1993, Donart et al. 1978a, Eyre 1980, Gardner 1951, Gibbens et al. 1983, Hennessy et al. 1983, Herbel et al. 1972, Hoagland 1998a, Humphrey 1974, McAuliffe 1995, McLaughlin and Bowers 1982, McPherson 1995, Muldavin and Mehlhop 1992, Schlesinger et al. 1990, Smith and Douglas 1989, Stromberg 1995a, Warren and Anderson 1985, Warren and Treadwell 1980, Warren et al. 1981, York and Dick-Peddie 1969